128442
MRID No.

1-9-91

112701
Shaughnessy No.

Data Evaluation Record

[redacted]DIFACOUM

Acute toxicity test for freshwater invertebrates.

**GUIDELINE NUMBER:** 72-2 (a) & (b)

**CITATION:** Gerry, C. 1978. Toxicity of the liquid concentrate, pelleted bait and technical material to first instar *Daphnia magna*. Submitted by ICI Americas, Inc., Agricultural Products, Wilmington, Delaware 19897. Report No. RJ004/6B. Study No. PP518/CH/01.

**REASON FOR SUBMISSION:** FIFRA '88 Reregistration.

| | | | |
|---|---|---|---|
| RESULTS- | Valid _____ | Invalid _____ | Supplemental X |
| GUIDELINE- | Satisfied _____ | Partially Satisfied _____ | Not Satisfied X |

**DISCUSSION:**

This study had been classified "Core" in 1978. The FIFRA '88 review of the data for the technical end-use products has revealed only nominal concentrations were used. Other Brodifacoum tests have shown that the nominal concentration can be less than half of the measured concentration, so this method is invalid.

The Technical grade was also done with nominal levels but the FIFRA '88 Summary provided some of the measured levels. The test was done in four sections, then the data was pooled. This procedure is not acceptable statistically, especially since *none* of the nominal levels had the same measured concentration between tests; levels had up to 4.3 times the nominal level. There are fourteen measured levels spread among the four studies. A "Supplemental" $LC_{50}$ was calculated using these data. They cannot be repaired because the pooling of the data is an incorrect procedure. The data are Measured Concentrations (mg/l) and Number Dead Out of 30.

| Concentrations | 19 | 11 | 8.9 | 8.8 | 5.0 | 4.4 | 4.3 | 2.5 | 2.3 | 1.8 | 1.1 | .98 | .9 | .6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number Dead | 30 | 30 | 30 | 30 | 30 | 28 | 24 | 27 | 30 | 29 | 17 | 17 | 2 | 6 |

**CONCLUSIONS:**

Change the classifications to- "Invalid" for TEPs and "Supplemental" for TG with $LC_{50}$ = 0.98 mg/l (CI 0.9 - 1.8).

**REVIEWED BY:**

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Signature: James J Goodyear
Date: Jan 9, 1991

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Signature: L W T
Date: 1-9-91

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VALIDATION SHEET CRF #_____PAGE_____OF_____

| FORMULATION: | | | IA | IB | T | FW | EC | R | | |
|---|---|---|---|---|---|---|---|---|---|---|
| % a.i. | SC # | CHEMICAL | Validator: Larry Turner | | | | | Date: April 18, 1979 | | |
| 93.3% | | brodifacoum | Test Type: Aquatic invertebrate acute 48 hour $LC_{50}$ Daphnia magna | | | | | | | |
| | | | Test ID.# ES-H2 | | | | | | | |

CITATION: Gerry, C. and W. Wilkinson. 1978. brodifacoum: Toxicity of the liquid concentrate, pelleted bait and technical material to first instar Daphnia magna. 16 p. Study conducted by ICI Plant Protection Division, report RJ0046B. Submitted by ICI Americas; 10182-26; Acc. No. 234655 Report 181. 8/15/78.

RESULTS: Daphnia magna 48 hour $LC_{50}$= 0.89 mg/liter (95% c.i. 0.81-0.99 mg/liter). No mortality occurred at the two lowest dose levels of 0.05 and 0.1 mg/l; 100% mortality occurred at the two highest dose levels of 10 and 20 mg/l. No water only control was run, but solvent controls of 0.5 and 1% acetone had 36% and 3% mortality, respectively. Nine of 11 deaths in the 0.5% control were all in the same beaker and occurred within 24 hours. Also included in this report were the results of tests on the 0.25% liquid concentrate and .005% pelleted bait. These results were previously reported when these tests were validated (ES-K1 and K2 of this review).

VALIDATION CATEGORY: Core

CATEGORY RATIONALE: Although the four tests were run at two different times, there was no attempt to hide this fact. The combined results are considered acceptable in spite of a somewhat high chi square value, because an acceptable chi square value and similar results were obtained when Test I and II or Tests III and IV were analyzed separately.

ABSTRACT: Daphnia magna first instars, 12 ± 12 hours old, were exposed to concentrations of technical brodifacoum in concentrations of 0 (0.5 and 1% solvent controls), 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10, and 20 mg/liter. The liquid concentrate and pelleted bait tests that were

reported have been previously validated in this review as test numbers ES-K1 and K2. Methodology for the technical material is the same as for Test ES-H1 of this review except as noted below.

Four tests of 30 daphnids (3 beakers of 10 daphnids each) were run, all with the same concentrations. Concentrations in Tests I and II were analyzed and found to be much higher than expected (88-104% of nominal at 100 mg/l stock solution, 118-204% of nominal at 10 mg/l, and 247-462% of nominal at 1 mg/l). It was considered probable that the beaker mixtures were not adequately mixed before samples were taken. To insure that the analysis was done on the actual solution to which the daphnids were exposed, Tests III and IV were conducted using a more thorough mixing procedure. Although Tests III and IV had measured concentrations much closer to nominal, the results for all four tests were reasonably consistent.

Statistical analysis was done by using weighted linear regression of log concentrations plotted against logit transformations of response. When results of all four tests were combined and analyzed on the EEB calculator by Finney probit, an $LC_{50}$ of 0.877 ppm was obtained, with a somewhat high chi square value of 21.171 for 7 degrees of freedom (14.07 is acceptable for 7 d.f.). Since Tests I and II were run concurrently and Tests III and IV were run concurrently on a different date, these pairs of tests were also statistically analyzed by EEB. Tests I and II gave an $EC_{50}$ of 0.932 ppm; both pairs had acceptable chi square values.

Daphnia 48 hour $EC_{50}$
brodifacoum tech 93.3%
Finney probit

L. Turner
4/19/79

Tests I and II combined.

| | |
|---|---|
| 0.05 | |
| 0. | |
| 60. | |
| 0.1 | |
| 0. | |
| 60. | |
| 0.2 | |
| 1. | |
| 60. | |
| 0.5 | |
| 8. | |
| 60. | |
| 1. | |
| 45. | |
| 60. | |
| 2. | |
| 54. | |
| 60. | |
| 5. | |
| 59. | |
| 60. | |
| 10. | |
| 60. | |
| 60. | |
| 20. | |
| 60. | |
| 60. | |
| 3.585 | M |
| 5.298 | YINT |
| 1.901 | LW M |
| 12.006 | $CHI^2$ |
| 0.826 | LD50 |
| 0.725 | LDCL |
| 0.941 | UPCL |
| 0.362 | LD10 |
| 0.293 | LDCL |
| 0.448 | UPCL |
| 1.881 | LD90 |
| 1.535 | LDCL |
| 2.306 | UPCL |

Tests I, II, and III combined.

| | |
|---|---|
| 0.05 | |
| 0. | |
| 120. | |
| 0.1 | |
| 0. | |
| 120. | |
| 0.2 | |
| 3. | |
| 120. | |
| 0.5 | |
| 14. | |
| 120. | |
| 1. | |
| 79. | |
| 120. | |
| 2. | |
| 110. | |
| 120. | |
| 5. | |
| 117. | |
| 120. | |
| 10. | |
| 120. | |
| 120. | |
| 20. | |
| 120. | |
| 120. | |
| 3.437 | M |
| 5.196 | YINT |
| 1.954 | LW M |
| 21.171 | $CHI^2$ |
| 0.877 | LD50 |
| 0.798 | LDCL |
| 0.964 | UPCL |
| 0.371 | LD10 |
| 0.319 | LDCL |
| 0.432 | UPCL |
| 2.070 | LD90 |
| 1.785 | LDCL |
| 2.401 | UPCL |

Tests III and IV combined.

| | |
|---|---|
| 0.05 | |
| 0. | |
| 60. | |
| 0.1 | |
| 0. | |
| 60. | |
| 0.2 | |
| 2. | |
| 60. | |
| 0.5 | |
| 6. | |
| 60. | |
| 1. | |
| 34. | |
| 60. | |
| 2. | |
| 56. | |
| 60. | |
| 5. | |
| 58. | |
| 60. | |
| 10. | |
| 60. | |
| 60. | |
| 20. | |
| 60. | |
| 60. | |
| 3.325 | M |
| 5.102 | YINT |
| 1.999 | LW M |
| 12.579 | $CHI^2$ |
| 0.932 | LD50 |
| 0.814 | LDCL |
| 1.067 | UPCL |
| 0.384 | LD10 |
| 0.309 | LDCL |
| 0.477 | UPCL |
| 2.265 | LD90 |
| 1.827 | LDCL |
| 2.806 | UPCL |

Daphnia 48 hour $EC_{50}$
brodifacoum tech 93.3%
Finney probit

L. Turner
4/19/79

Tests I and II combined.

| | |
|---|---|
| 0.05 | |
| 0. | |
| 60. | |
| 0.1 | |
| 0. | |
| 60. | |
| 0.2 | |
| 1. | |
| 60. | |
| 0.5 | |
| 8. | |
| 60. | |
| 1. | |
| 45. | |
| 60. | |
| 2. | |
| 54. | |
| 60. | |
| 5. | |
| 59. | |
| 60. | |
| 10. | |
| 60. | |
| 60. | |
| 20. | |
| 60. | |
| 60. | |
| 3.585 | M |
| 5.298 | YINT |
| 1.901 | LW M |
| 12.006 | $CHI^2$ |
| 0.826 | LD50 |
| 0.725 | LDCL |
| 0.941 | UPCL |
| 0.362 | LD10 |
| 0.293 | LDCL |
| 0.448 | UPCL |
| 1.881 | LD90 |
| 1.535 | LDCL |
| 2.306 | UPCL |

Tests I, II, III and III combined.

| | |
|---|---|
| 0.05 | |
| 0. | |
| 120. | |
| 0.1 | |
| 0. | |
| 120. | |
| 0.2 | |
| 3. | |
| 120. | |
| 0.5 | |
| 14. | |
| 120. | |
| 1. | |
| 79. | |
| 120. | |
| 2. | |
| 110. | |
| 120. | |
| 5. | |
| 117. | |
| 120. | |
| 10. | |
| 120. | |
| 120. | |
| 20. | |
| 120. | |
| 120. | |
| 3.437 | M |
| 5.196 | YINT |
| 1.954 | LW M |
| 21.171 | $CHI^2$ |
| 0.877 | LD50 |
| 0.798 | LDCL |
| 0.964 | UPCL |
| 0.371 | LD10 |
| 0.319 | LDCL |
| 0.432 | UPCL |
| 2.070 | LD90 |
| 1.785 | LDCL |
| 2.401 | UPCL |

Tests III and III combined.

| | |
|---|---|
| 0.05 | |
| 0. | |
| 60. | |
| 0.1 | |
| 0. | |
| 60. | |
| 0.2 | |
| 2. | |
| 60. | |
| 0.5 | |
| 6. | |
| 60. | |
| 1. | |
| 34. | |
| 60. | |
| 2. | |
| 56. | |
| 60. | |
| 5. | |
| 58. | |
| 60. | |
| 10. | |
| 60. | |
| 60. | |
| 20. | |
| 60. | |
| 60. | |
| 3.325 | M |
| 5.102 | YINT |
| 1.999 | LW M |
| 12.579 | $CHI^2$ |
| 0.932 | LD50 |
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| 1.067 | UPCL |
| 0.384 | LD10 |
| 0.309 | LDCL |
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| 2.265 | LD90 |
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